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ABSTRACT

This is a review of studies designed to assess the attributes of teacher-student interaction predicted to be correlated with student achievement. The paper includes: (1) a summary review of the types of teacher characteristics found to be correlated with student achievement and attitude; (2) a summary of the research done using the Flanders Interaction Analysis Index; and (3) a final summary and conclusions section followed by an extensive list of references. The review of available research makes it clear that good experimental research in the area of student-teacher interaction has been relatively sparse. There are a number of problems with existing studies: primarily, nearly all studies to date have been correlational in nature. Many have used scales designed for use with all grade levels with no allowances made. Consequently, findings have been inconsistent across grade levels. A third problem is that many studies and systems of observations do not include reliability data nor is the rating scale specific to the subject matter. Probably the most important shortcoming of research in this area is that few scales take into account which students are interacting with the teacher and most use a total class mean as opposed to individual evaluations in determining academic achievement. Two final problems are that studies use a relatively low number of teachers and an inadequate number of observations of each teacher to obtain significant data. (DMT)

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Review of Research on Classroom Communication Patterns, Leading to Improved Student Performance

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The original purpose of this review was to prepare for a study of classroom interaction. This study was to be designed to look at the relationship between the information level of the teacher's verbal output and an estimate of the child's ability to comprehend. On the teacher's side, analysis of verbal output was to be looked at in terms of information contained in that output. On the student's side, analysis of information available to the child would be ascertained by tests over material to be covered by the teacher. It was then hoped that a way could be designed in which it would be possible to acquire an index of how much of the school day was relevant for specific students. Relevancy was to be defined in terms of whether or not the information which was being presented was new to the child and still comprehensible so that new learning would take place. That is, information that was not above the child's competency to understand or not redundant was to be classified as relevant. The idea of matching the level of child with level of information being acquired is of course not original and has been discussed elsewhere. In fact, that type of matching is what the open classroom is developed to provide. The philosophy of the present author is, however, different from that of the open classroom advocates in two ways. First, it would give more emphasis to the role of the teacher both as a motivator and also as a structurer of the environment. The teacher's role would be more to make major decisions and then justify these decisions to the child rather than emphasize the child's role in the decision making process. Second, more time would be spent in group work when there was evidence that working with individuals would be a waste of time.

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The long term goals of this line of research would include (1) being able to make predictions concerning which students in a classroom would progress most, based upon the pattern and level of information provided by the teacher, (2) actually instituting experimental treatments in classrooms by specifying to teachers the type of information which should be provided to specific children. This would include looking at both the qualitative level of the child's functioning and quantitative amount of information available in deciding what type of input should be provided for maximum learning.

With the above objective in mind, the studies to be reviewed here are those which were designed to assess attributes of teacher-student interaction which were predicted to be correlated with some sort of student gain. That is, those studies which predicted that student-teacher interaction measures would be correlated with student achievement or student attitude.

For those who are interested, there are a number of more inclusive summaries of teacher-student interaction studies already in existence (Withall and Lewis, 1963; Medley and Mitzel, 1963; Rosenshine, 1970; Maux, 1967; Aschner, 1963; Amidon and Simon, 1965; Levin, Hilton and Leiderman, 1957; Rosenshine and Furst, 1971). For those interested in looking at student-teacher rating instruments the most inclusive (although not all inclusive) list along with detailed descriptions is included in a publication by Simon and Boyer (1970). In addition, Research for Better Schools, Inc., publishes a monthly newsletter which includes up to date unpublished and published research in this area.

The plan for the remainder of this paper includes (1) an initial summary review of the types of teacher characteristics which have been found to be correlated with student achievement or attitude (2) a summary of the research done using the Flanders Interaction Analysis Index (this is done separately since the Flanders scale is the most used index in this area) and finally (3) a summary and conclusions section.

Summary of Research Findings to Date

The most recent extensive review of the interaction research using student performance as a correlate of teacher behavior was the paper by Rosenshine and Furst (1971). These authors list 11 teacher variables which have been correlated to varying degrees with student performance. Because this is a recent and extremely comprehensive review, the present author has used the categories of behavior used by Rosenshine and Furst which involve observed student-teacher interaction in discussing the findings to date. The present author has also included the references used by Rosenshine and Furst along with new references where appropriate.

Before beginning it is important to note that one of the more important dimensions along which these scales can be divided is the degree of inference required by the rater. That is, if the scale is merely a frequency count of behaviors then little inference on the part of the rater is required. On the other hand, if the scale asks the rater to measure the degree to which someting exists in the classroom (e.g. teacher clarity) a great deal of inference is required on the part of the rater. It is obviously true that the more opportunity for inference the greater the opportunity there is for low inter-rater reliability and thus the less confidence one can have in the findings and the less chance there is that replication can be acquired using different raters. It is important to keep this in mind when the results of studies are considered.

The category of teacher behavior showing the highest relationship with student gain is clarity of presentation (Belgard, Rosenshine and Gage, 1968; Fortune, 1967; Fortune, Gage and Shutes, 1966; Soloman, Bezdek and Rosenberg, 1963; Wallen, 1966; Chall and Feldman, 1966). It is obvious that this is a high inference behavior on the part of the rater. What may be clear to the rater may not be clear to the student. In fact, what may be clear to one student may not be clear to another. Rosenshine and Furst believe that future research should be directed toward more carefully defining behaviors which comprise clarity. The present author thinks it is interesting that these behaviors would probably require careful lesson

plans and detailed lectures or presentations which are somewhat against the current emphasis on discovery learning and open classrooms (one has to be careful here because correct use of the open classroom philosophy requires that there be a detailed plan for each child).

A second category of behaviors associated with student gain has been labeled variablity or variety. This refers to using many different teaching devices, types of tests and lecture techniques (Anthony, 1967; Lea, 1967; Furst, 1967; Thompson and Bowers, 1968; Soloman, Bezdek and Rosenberg, 1963; Torrance and Parent, 1966; Walberg, 1969). This includes studies which used both high and low inference rating scales. Unfortunately, when low inference definitions have been used (e.g. number of specific types of behavior which were exhibited) no significant correlations between the number of teacher behaviors and the student gain have been found (Soar, 1966; Snider, 1966; Vorreyer, 1965).

A particularly high inference behavior is that of teacher enthusiasm. Here again we find significant correlations with student performance but no specific behaviors (Fortune, 1967; Kleinman, 1964; Wallen, 1966; Soloman, Bezdek and Rosenberg, 1963).

The results of studies measuring a task oriented or business like behavior have also found relationships between such behaviors and student performance (Fortune, 1967; Kleinman, 1964; Chall and Feldman, 1966; Wallen, 1966). If teachers seem content oriented and less apt to emphasize having the children enjoy themselves there is a better chance that the children will learn.

Criticism is a behavior which has been found to correlate negatively with student gain in a number of studies (Flanders, 1970; Hunter, 1968; Harris and Serwer, 1966; Anthony, 1967; Cook, 1967; Hunter, 1968; Harris et al, 1968; Soar, 1966; Wallen, 1966). It is interesting to note that it has been found that significant negative correlations only occur when severe criticism was used. Rosenshine says "In no study was there a significant negative correlation between mild forms of criticism or control and student achievement" (p. 51). These mild

forms include mainly information types of comments such as saying to the child that he is incorrect or providing new academic directions.

Several researchers have attempted to classify the types of questions which teachers ask and then looked at subsequent student achievement to determine whether there is a relationship between the two variables. In general, the questions are rated on level of answer required by the teacher (e.g. straight recall or requiring reasoning). The positive studies find that teachers asking higher level questions also have higher achieving students (Kleinman, 1964; Spaulding, 1965). There are however, a number of such studies in which significant results were not obtained (Harris and Serwer, 1966; Harris et al, 1968, Perkins, 1965; Wright and Nuthall, 1970)

The Flanders System of Interaction Analysis

The most used instrument in recent years for recording student-teacher interaction has been the Flanders System of Interaction Analysis (FSIA). Actually the name is somewhat misleading since the emphasis is really on the teacher's behavior. Student behavior is only recorded when the teacher is not engaged in any activity other than observing or listening. The instrument includes seven categories of teacher behavior and 2 categories of student talk. The teacher behaviors (assumed to be all inclusive of teacher behaviors) are divided into two broad categories of teacher influence labeled indirect and direct. The indirect influence categories include (1) accepts feeling (2) praises and encourages (3) accepts or uses ideas of student (4) asks questions. The direct influence categories include (5) lecturing (6) giving directions and (7) criticizing or justifying authority. The two student talk categories are (8) student talk-response and (9) student talk-initiation. Finally, there is a category 10 labeled silence or confusion.

Since this is a low inference scale in which behaviors are tabulated without requiring the observer to make any judgments, the degree of interrater reliability

becomes quite high after a short training period. Although the instrument has been most used in training teachers, there have been a number of studies which attempt to look at behavior patterns of teachers with the goal of determining more effective teacher behavior patterns. The operational definitions of effective include both student attitude and student achievement.

Flanders himself reports seven studies which he conducted between 1955 and 1967 that are included in two publications (Flanders, 1965, 1970). For the first six studies (using grades 7, 4, 8 and 6) the procedures followed were essentially the same:

(1) An inventory assessing positive pupil attitudes were administered to a sample of classrooms. This sample was chosen so as to be representative of a larger population of similar classrooms in a given geographical area.

(2) Average scores on the inventory were calculated for each class. The classes located at the extremes of the resulting distribution of scores were selected for observation, except for projects 5 and 6 which also included classrooms selected from the middle of the distribution. The purpose of selecting extreme classrooms was to increase the range of interaction patterns in the study. However, average attitude scores are far from perfectly correlated with interaction patterns, so at best this procedure only increased the odds that here would be wider variation among classrooms with respect to interaction patterns.

(3) The classes so isolated were then observed and the classroom interaction coded by trained observers. Except for projects 1 and 2 an assessment was made of content achievement before and after the observations. Final achievement scores could then be adjusted according to intial achievement by a regression technique (Flanders, 1970; p. 390-391).

The seventh study which used second grade teachers did not include the initial pupil attitude inventory but merely selected teachers at random. This study did not produce the same results as the other studies and Flanders blames

the different sample for these deviant findings.

In all studies the teachers had to volunteer to have their students sampled before they were included. The major hypotheses in most studies seemed to be that the important differences between teachers who had students with positive attitudes from teachers who had students with negative attitudes was in the amount of indirect teacher behavior. Students of indirect teachers should achieve more and have more positive attitudes. Indirect teachers were defined by the two ratios of I/D (where I stands for all indirect behaviors and D for all direct behaviors) and i/d (where i is the same as I but d only includes category 7). The hypotheses was tested in some studies by comparing mean amount of indirect behavior of teachers of students who had the most positive attitudes with mean amount of indirect behavior of teachers of students who had the least positive attitudes or ranking teachers on the amount of indirect behavior exhibited and comparing student achievement or student attitudes of students of teachers exhibiting the most indirect behavior with students of teachers exhibiting the least indirect behavior. This latter procedure has some problems in that the students of indirect teachers have generally been found to be smarter (higher initial achievement scores) than students of direct teachers. This has led to the necessity of a statistical adjustment for achievement scores. When this adjustment is made, Flanders found that students of indirect teachers had better attitudes and higher achievement scores than students of direct teachers.

For the final four studies, Flanders used a number of correlational techniques (factor analysis, multiple regression) to obtain the best predictors of student achievement and student attitude for each study. In these cases the results were less consistent and Flanders concluded, "If future studies have similar results, then the following generalization would be supported: a single interaction analysis predictor is not likely to be associated equally well with different outcome variables, different grade levels and different learning activities" (p. 397).

In spite of the obvious shortcomings of field research, the advocates of the FSIA have collected an impressive amount of data. Some of its most ardent advocates even see the scale as an important advance in understanding the process of teaching (Morrison, 1967; Pankratz, 1967; Powell, 1967; Weber, 1965; Campbell and Barnes, 1969). Again, most of the studies report more positive results from teachers categorized as indirect.

One of the more impressive attempts at making use of the interaction analysis is that of Soar (1968) who after anlyzing interaction patterns of teacher behavior and different measures of student growth obtained from 54 elementary school classrooms suggested that there may be different curvilinear relationships between amount of teacher indirectness (or directness using the criticism measure) exhibited by the teachers and different student attitude or achivement outcomes.

The major problem with this whole line of research as the present author sees it is finally stated by Flanders (1967) on the next to last page of his book, where Flanders says, "Does indirect teaching behavior cause more learning and more positive attitudes or do brighter youngsters who can learn more and are more likely to have positive attitudes provide a teacher with the opportunity to be more indirect? The projects reviewed shed very little light on this issue" (p. 426).

Summary and Conclusion

From the above review it should be clear that good experimental research in this area has been relatively sparse and indeed several of the other reviews begin with a plea for more and better research in the area. In general, there are a number of glaring problems with the research done so far. In the first place, nearly all studies to date have been correlational in nature even though it is not uncommon for the authors to infer causation. In fact, to the present author's knowledge there has been only one study which actually asked teachers to exhibit a specific behavior pattern (Worthen, 1968) and then monitored the teachers' behavior. This

was not a study of teacher student interaction but rather a comparison of the effectiveness of two teaching techniques (discovery and expository). Interestingly enough the same author (Worthen and Collins, 1971) later had to repudiate his earlier results on the basis of incorrect analysis (using the wrong degrees of freedom). Clearly, before we can make inferences about the relative effectiveness of different teacher-student interaction patterns we must have some experimental studies.

A second weakness of many studies has been the fact that they used scales which are designed to be used with all grade levels for no allowance for differences among grade levels. As reported earlier, findings have not been consistent across grade levels leading to the suspicion that different teacher behaviors may be exhibited at different grade levels.

With the exception of the early classic studies of Anderson and Brewer (1963, 1964) few observational studies of any kind have been done with preschool children. Katz (1969) in a recent survey found only one preschool study which used observation of in-class behavior.

A third problem is that many of the studies and observational systems do not include any reliability data at all (for an excellent discussion of reliability problems encountered in using observational instruments see Mitzol and Medley, 1965). Obviously, unless reliabilities across time and rater are established any experimenter using the scale is treading on very shallow ice.

Another problem is that most rating scales are designed to be used for all subject matters. While is it clearly desirable to have one all purpose instrument, it is still possible that different subject matter teachers exhibit different behaviors and that this possibility should at least be investigated.

Probably one of the most important shortcomings of the research in this area is that few of the scales take into account which students are interacting with

the teacher. For instance, the FSIA has no provision for identifying the frequency with which a teacher interacts with a specific student. Good and Brophy (Good and Brophy, 1971; Brophy and Good, 1970) have been particularly vocal in this point. They point out that this procedure implies that interaction variables being studied are properly conceptualized as interactions between the teacher and the class as a unit rather than as an interaction between the teacher and a single student and that teachers are consistent across students in their classroom behavior so that individual differences within a classroom are of little or no importance relative to interclass differences. These implications are clearly questionable at best and Good and Brophy quote a number of studies including their own work to show that teachers do indeed interact with different students in different ways (Brophy and Good, 1970; Davis and Dollard, 1940; Becker, 1952; Hoehn, 1954; DeGroat and Thompson, 1949; Meyer and Thompson, 1956; Davis and Slobodion, 1967).

A closely related problem is that most studies use in their analysis of academic gain a total class mean rather than looking at gains of specific children (e.g. children who receive teacher attention). Any study which uses a class mean can obviously be masking important effects which are occurring within the classroom to particular children who exhibit a particular characteristic or belong to a particular group. The problem of course is determining the important student characteristics.

Two final problems are that studies generally use a relatively low number of teachers and an inadequate number of observations on each teacher. Nearly all experimenters assume that teachers exhibit relatively stable characteristics and the possibility that it is the students which dictate the behavior of the teacher seems to be ignored. In fact, no study to the present author's knowledge has observed the same teacher teaching more than one class of children in which each class has a specifiable difference in student makeup (e.g. intelligence, social class, etc.).

In summary, a tremendous amount of work must be done in the area of research design before we can begin to have confidence in research findings which attempt to measure student-teacher interaction patterns. Until we begin to utilize the experimental design and retreat from the correlational design this entire area of research will contribute very little to our knowledge of the teaching process.

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